



Calhoun: The NPS Institutional Archive

Reports and Technical Reports

All Technical Reports Collection

2010-11

Nontechnical Skills for Officers of the Deck (NTSOD) rating form : a user's guide

Long, W. Max

Monterey, California. Naval Postgraduate School

<http://hdl.handle.net/10945/769>



Calhoun is a project of the Dudley Knox Library at NPS, furthering the precepts and goals of open government and government transparency. All information contained herein has been approved for release by the NPS Public Affairs Officer.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

Nontechnical Skills for Officers of the Deck (NTSOD) Rating Form: A User's Guide

by

LT W. Max Long, USN
Paul E. O'Connor, Ph.D.
Michael E. McCauley, Ph.D.

November 2010

Approved for public release; distribution is unlimited

Prepared for: Surface Warfare Officer School
446 Cushing Rd
Newport, RI 02841

THIS PAGE INTENTIONALLY LEFT BLANK

**NAVAL POSTGRADUATE SCHOOL
MONTEREY, CA 93943-5001**

Daniel T. Oliver
President

Leonard A. Ferrari
Executive Vice President and
Provost

This report was prepared for Surface Warfare Officer School, 446 Cushing Rd., Newport,
Rhode Island 02841

Reproduction of all or part of this report is authorized.

This report was prepared by:

W. MAX LONG
Lieutenant, United States Navy

PAUL E. O'CONNOR
Assistant Professor of Operations Research

MICHAEL E. MCCAULEY
Research Professor of
Operations Research

Reviewed by:

RONALD D. FRICKER
Associate Chairman for Research
Department of Operations Research

Released by:

ROBERT F. DELL
Chairman
Department of Operations Research

KARL VAN BIBBER
Vice President and
Dean of Research

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 11-2010		2. REPORT TYPE Technical Report		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Nontechnical Skills for Officers of the Deck (NTSOD) Rating Form: A User's Guide			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) W. Max Long Paul E. O'Connor Michael E. McCauley			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER NPS-OR-10-009		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited					
13. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.					
14. ABSTRACT This user's guide introduces the Nontechnical Skills for Officers of the Deck (NTSOD) rating form and provides guidance for how it should be used. The purpose of the NTSOD rating system is to provide a framework for evaluating the nontechnical skills of U.S. Navy Surface Warfare Officers of the Deck (OOD). Nontechnical skills are the cognitive, social, and personal skills that complement technical skills. The NTSOD system supplements the current OOD qualification process by providing an objective and documented assessment of the nontechnical skills of OOD candidates. The NTSOD system consists of four categories of behavior (leadership, communication, situational awareness, and decision making), which are subdivided into 10 more specific, and observable, elements of behavior. The framework was developed through the analysis of data collected from qualified OODs. When properly utilized, the authors believe that the NTSOD system can produce skilled OODs, and increase the overall safety of the surface fleet by providing feedback on a crucial aspect of OOD performance that is not consistently evaluated across the Surface Fleet.					
15. SUBJECT TERMS Surface Warfare Officers, Officer of the Deck, Behavioral Markers, Nontechnical Skills					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 27	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This user's guide introduces the Nontechnical Skills for Officers of the Deck (NTSOD) rating form and provides guidance for how it should be used. The purpose of the NTSOD rating system is to provide a framework for evaluating the nontechnical skills of U.S. Navy Surface Warfare Officers of the Deck (OOD). Nontechnical skills are the cognitive, social, and personal skills that complement technical skills. The NTSOD system supplements the current OOD qualification process by providing an objective and documented assessment of the nontechnical skills of OOD candidates. The NTSOD system consists of four categories of behavior (leadership, communication, situational awareness, and decision making), which are subdivided into 10 more specific, and observable, elements of behavior. The framework was developed through the analysis of data collected from qualified OODs. When properly utilized, the authors believe that the NTSOD system can produce skilled OODs, and increase the overall mission effectiveness and safety of the surface fleet by providing feedback on a crucial aspect of OOD performance that is not consistently evaluated across the Surface Fleet.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

The Officer of the Deck (OOD) occupies a unique position in a naval ship. Nowhere in military or civilian life is there a parallel to the range and degree of responsibility that is placed in the hands of the OOD. As direct representative of the captain, he or she acts with all the authority of command and, next to the captain and the executive officer (XO), is the most important person on the ship (Stavridis & Girrier, 2007, p. 1).

As demonstrated by the above quote from the *Watch Officer's Guide*, when underway, the OOD is the most important watch station onboard United States Navy vessels. It is difficult to overstate the duties and responsibilities that are inherent with the position. OPNAVINST 3120.32C (2003) established the basic function of the watch. "The Officer of the Deck underway has been designated by the Commanding Officer (CO) to be in charge of the ship including its safe and proper operation (p. 4-18)."

The qualification process for OODs consists primarily of completion of the Personnel Qualification Standards (PQS) and an oral board administered by the CO, XO, and selected department heads. Since the PQS is consistent across the Surface Fleet, it ensures baseline knowledge for all OOD candidates. It consists of line items that qualified OODs verify once the candidate has displayed adequate knowledge of that item. These line items primarily concentrate on technical skills and knowledge such as visually determining a ship's target angle and determining compass error using a range. The PQS also ensures that OODs have the technical knowledge required to respond to emergencies and infrequent tasks.

While technical skills and knowledge are important to all professions including the military, Admiral Stavridis and Captain Girrier (2007) identified them as the sixth most important characteristic of a successful OOD. Nontechnical skills such as vigilance, leadership, and judgment are valued as traits that are more important for an effective OOD. Nontechnical skills are the cognitive, social, and personal skills that complement technical skills (Flin, O'Connor, & Crichton, 2008). These skills are not new or mysterious. They are skills that the most effective OODs instinctively apply while

standing the watch. Despite their obvious importance, nontechnical skills for OOD candidates are not evaluated consistently across the Surface Fleet.

This user's guide introduces the Nontechnical Skills for Officers of the Deck (NTSOD) rating form and provides guidance for its use. NTSOD was developed through the analysis of data collected from qualified OODs describing stressful situations they had encountered while on watch (see Long, 2010, for details of the analysis and development of NTSOD). The intention is not for the NTSOD rating form to replace the PQS and oral board qualification process. Instead, it is designed to augment the qualification process by providing the CO with a documented and quantifiable system for reliably evaluating the nontechnical skills of OOD candidates.

II. GENERAL INFORMATION

A. BEHAVIORAL MARKER SYSTEMS

High-risk professions such as medicine, civilian aviation, and nuclear power already use behavioral marker systems to identify and assess the observable nontechnical skills required for high performance. They are typically created from a taxonomy of nontechnical skills that contribute to the overall quality of task performance (Yule, Flin, Paterson-Brown, Maran, & Rowley, 2006). The following section discusses a behavioral marker system developed specifically for U.S Navy OODs.

B. THE NTSOD SYSTEM

The NTSOD rating form is a behavioral marker system that allows senior ships' personnel to identify and assess the nontechnical skills of potential OODs. The NTSOD system is included as an Appendix of this document. While some of the same nontechnical skill categories may apply, the system is not intended for evaluating the performance of personnel on other watches or positions. The authors believe that proper use of the NTSOD system will improve the effectiveness of OODs and, therefore, improve the safety and reliability of U.S. Navy vessels.

NTSOD identifies four nontechnical skills crucial to the development of effective OODs. These four skills are subdivided into 10 elements that are graded by observing the behaviors of the individuals standing the watch. This list is not designed to be comprehensive (evaluating every aspect of behavior would be an impossible task), but it provides an objective framework for assessing, and providing feedback on, the key nontechnical skills of an effective OOD without overloading the rater with extra tasks and paperwork.

THIS PAGE INTENTIONALLY LEFT BLANK

III. THE NTSOD SYSTEM

In this section, the five categories and 10 elements that make up the NTSOD system are described, with effective and ineffective examples provided.

A. LEADERSHIP

The Navy defines leadership as the “sum of those qualities of intellect, of human understanding, and of moral character that enable a person to inspire and to manage a group of people successfully (Stavridis & Girrier, 2007, p. 8).”

1. Managing Watch Team

A normal underway watch can be characterized by long stretches of monotony followed by periods of fast-paced action. The OOD’s ability to manage the watch team through the peaks and valleys of activity is crucial to the overall effectiveness and readiness of the ship.

a. Example of an Effective Behavior

- The OOD utilized the dead time in the schedule to review the emergency procedures with the helmsman.

b. Example of an Ineffective Behavior

- The OOD did not delegate the responsibility of calling the XO to the Conning Officer even though the OOD was already concentrating on four other things.

2. Managing Stress

Life at sea can be a stressful environment for Surface Warfare Officers. The responsibilities to his or her division and collateral duties pile up, and fatigue often becomes an issue. The ability to block out, or compartmentalize, the stressors and concentrate on the watch is crucial to the effective performance of the watch team.

a. Example of an Effective Behavior

- Despite the added pressure from the XO, the OOD managed the stress and performed proficiently.

b. Example of an Ineffective Behavior

- After standing watch in his whites for seven straight hours, the OOD became very agitated with his watch team.

B. COMMUNICATION

Communication is the exchange of information, ideas, and feelings (Flin et al., 2008).

1. Providing Information

The OOD is directly responsible for providing information to the CO and XO as well as the navigator in certain situations. He or she must pass information along to other assets in the area, as well as to other watch stations throughout the ship. The ability to provide the information in a clear and concise manner greatly increases the effectiveness of the OOD and the confidence of the chain of command.

a. Example of an Effective Behavior

- The OOD called the other ships in formation to inform them that the passing oiler was dimly lit and difficult to see.

b. Example of an Ineffective Behavior

- The OOD never once called the CO during the entire crisis.

2. Issuing Orders

The OOD is directly in charge of a watch team consisting of at least eight sailors. The engineering and combat watches also report to the OOD during normal operations. These responsibilities necessitate that the OOD issues orders to a wide range of individuals in many different situations.

a. Example of an Effective Behavior

- The OOD ordered the Engineering Officer of the Watch (EOOW) to start another engine.

b. Example of an Ineffective Behavior

- The Conning Officer did not understand what the OOD wanted because he was never given an order.

C. SITUATIONAL AWARENESS

“Situational awareness is the perception of the elements in the environment within a volume of space and time, the comprehension of their meaning, and the projection of their status in the near future (Endsley, 1995, p. 36).”

1. Gathering Awareness

The environment around a naval vessel is constantly shifting. The OOD must actively gather information about his or her surroundings to keep up with the changes and adjust accordingly. The OOD has many tools available to help increase situational awareness including radars, lookouts, and his or her own eyes. Properly utilizing these tools is crucial to gathering accurate information about the surrounding environment.

a. Example of an Effective Behavior

- At two nautical miles out, the OOD visually inspected the contact through binoculars.

b. Example of an Ineffective Behavior

- The OOD did not check his bridge wing before ordering the turn.

2. Understanding Awareness

Simply gathering information is not enough to achieve good situational awareness. The OOD needs to use the tools at his or her disposal to achieve an understanding of what the information means.

a. Example of an Effective Behavior

- The OOD identified the contact as a fishing vessel by analyzing the lighting configuration.

b. Example of an Ineffective Behavior

- The OOD saw the contact, but he did not realize that it was on a collision course.

3. Anticipating Future Events

Once there is a general understanding of the situation, effective OODs will be able to project the information into the future in order to anticipate what is coming next.

a. Example of an Effective Behavior

- The OOD had the Conning Officer drive slightly right of the intended track because he knew the wind and current would push the ship to the left.

b. Example of an Ineffective Behavior

- As the fishing vessel started to slow and turn to port, the OOD did not realize that he would no longer be able to pass the vessel on the port side.

D. DECISION MAKING

Decision making is the process of reaching a judgment or choosing an option to meet the needs of a given situation (Flin et al., 2008).

1. Analytical Decision Making

Analytical decision making involves the comparisons of multiple courses of actions to come up with the optimal solution. The OOD encounters many situations that require a careful analysis of multiple options. The ability to consistently select the best alternative is a valuable skill for an OOD.

a. Example of an Effective Behavior

- Once the oiler was located, the OOD decided to start driving towards her early to ensure that there was plenty of time to set up later.

b. Example of an Ineffective Behavior

- During a time of confusion, the OOD never considered aborting the exercise.

2. Following Orders and Procedures

The OOD deals with many situations that are highly structured through either documented procedures or direct orders from superior officers. When properly utilized, night orders, checklists, and emergency operating procedures are a few examples of the tools that make the OOD's job much easier.

a. Example of an Effective Behavior

- The OOD used the wind envelope guide to make sure that the winds were sufficient to conduct flight operations.

b. Example of an Ineffective Behavior

- The OOD decided not to follow the CO's night orders because he did not think it would make any difference.

3. Intuitive Decision Making

The OOD also encounters situations where there is insufficient time to follow a documented procedure or conduct an analysis of alternatives. These instances require the OOD to make quick decisions based upon prior experience and intuition. These situations tend to be the most critical and the CO must have confidence that the OOD will be able to make the right decision.

a. Example of an Effective Behavior

- When the mysterious light finally materialized as a sailboat 300 yards off the port bow, the OOD immediately ordered “Hard Right Rudder.”

b. Example of an Ineffective Behavior

- When the lookout reported the man overboard, the OOD hesitated indecisively for several moments before ordering the Conning Officer to maneuver the ship to pick up the sailor.

IV. INSTRUCTIONS FOR USE

A. THE HEADER SECTION

The header section is designed to personalize each NTSOD rating form (see the Appendix). Spaces are provided to input the ship's name and the date. The trainee and the assessor are also identified.

There is a space provided to enter the watch that is being stood. This entry refers to the time of day that the person is standing OOD. There are different watch rotations throughout the Navy, but examples would be 2200-0200 or 0700-1200.

The evolution space refers to any special events that are taking place during the watch. Normal underway steaming would be one example. If an underway replenishment or anchoring evolution is taking place, it would also be written down.

B. THE RATING SECTION

The rating section was designed so that both the individual elements and the broader nontechnical skill categories of NTSOD can be assessed and given scores. The element ratings provide a greater detail of feedback to both the trainer and the trainee. The nontechnical skill ratings allow the upper chain of command to get an overall feel for the trainee's performance with a quick glance.

The ratings scale is a four-tier system. Ratings of 1 (unsatisfactory) and 2 (marginal) indicate that improvement is needed with a specific element or skill. Ratings of 3 (satisfactory) or 4 (outstanding) indicate that the trainee displays adequate performance in the applicable nontechnical skills given their level of experience. It is possible that not every skill will be demonstrated by the OOD during a watch. Therefore, there is also the option of not observed (N/O).

Each element that was demonstrated during a watch should be given a rating. When assigning ratings for the elements, the assessor should create a comprehensive picture of how the trainee performed over the entire evolution. While the individual may have forgotten to pass a piece of information along to the CO on one occasion, his or her

overall ability to provide information may have been very good. Because of these complexities, only qualified and trusted personnel should be assigned as assessors. The assessor will need to judge the trainee's overall competence, so they must be able to recognize effective and ineffective behaviors.

The overall nontechnical skill category ratings should be equal to the lowest rating of the associated elements. For example, a rating of 4 for managing watch team and a score of 3 for scoping with stress would result in an overall score of 3 for leadership. If all the elements are N/O, the category rating also would be N/O.

C. THE NOTES SECTION

The NTSOD system has been designed to maximize the notes section because it is the most important part. The notes section should be used extensively because it gives the assessor a better idea of what rating to assign, and it allows the assessor to give the trainee detailed feedback on what areas need improvement.

D. GENERAL RECOMMENDATIONS FOR USING NTSOD

- Qualified and trusted individuals should be designated to rate the potential OODs. Careful selection of the raters will provide a higher level of feedback and effectiveness for the NTSOD system.
- Single NTSOD forms create a snapshot of a specific watch or evolution. Multiple forms over time create an overall picture of how the trainee is improving or regressing in certain categories. Therefore, rating forms should be retained as part of a candidate's training jacket to show the progress of individuals over time.
- All raters and candidates should become familiar with this booklet and the overall NTSOD system prior to use.
- Each time the NTSOD system is used, a full debriefing should be given to the candidate.

- To eliminate potential bias, raters should be familiar with the seven common rating errors (Flin et al., 2008).
 1. Halo effect – one particular positive aspect is overemphasized and enhances the ratings on other dimensions. For example, a candidate possessing great leadership is given higher scores in the other categories without cause.
 2. Horns effect – one particular negative aspect is overemphasized and lowers the ratings on the other dimensions. For example, a candidate who exhibits poor decision making is marked down on other categories without cause.
 3. Central tendency – ratings are clustered around the mid-point of the scale.
 4. Leniency – the rater has a tendency to give favorable ratings.
 5. Severity – the rater has a tendency to give unfavorable ratings.
 6. Primacy – the rater gives increased weight to the behaviors that are observed first.
 7. Recency – the rater gives increased weight to the behaviors that are observed last.
- It is important to note that the NTSOD system has not yet been tested in the fleet. Directions for use may need to be adjusted to match certain situations that the developer did not foresee.

F. CONCLUSION

Analysis shows that in high-risk occupations about 80% of accidents result from human error (Flin et al., 2008). The current OOD qualification process ensures that the candidate possesses the technical knowledge and skills necessary to stand the watch. However, currently there is no guidance for how to evaluate nontechnical skills. The

NTSOD addresses the need to provide feedback to OODs on their nontechnical skills by providing a research-based system that supports objective and quantifiable feedback.

G. SUGGESTED FURTHER READING

Chief of Naval Operations. (2005). *Standard organization and regulations of the U.S. Navy* (OPNAVINST 3120.32C CH-6). Washington, D.C.: Department of the Navy.

Flin, R., O'Connor, P., & Crichton, M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Aldershot, England: Ashgate Publishing Limited.

Klumpfer, B., Flin, R., Helmreich, R., Häusler, R., Sexton, B., Fletcher G., et al. (2001). Enhancing performance in high risk environments: Recommendations for the use of behavioural markers. Behavioural Markers Workshop. Zurich. Available from: homepage.psy.utexas.edu/homepage/group/helmreichlab/publications/pubfiles/pub262.pdf.

Long, W. M. (2010, December) Development of the non-technical skills for officers of the deck (NTSOD) rating form. Master's thesis. Monterey, CA: Naval Postgraduate School.

Stavridis, J., & Girrier, R. (2007). *Watch officer's guide* (15th ed.). Annapolis, MD: United States Naval Institute.

APPENDIX. NONTECHNICAL SKILLS FOR OFFICERS OF THE DECK (NTSOD) RATING FORM

Ship_____

Trainee_____

Watch _____

Date_____

Assessor_____

Evolution _____

Category	Category Rating*	Element	Element Rating*	Notes
Leadership		Managing Watch Team		
		Coping with Stress		
Communications		Providing Information		
		Issuing Orders		
Situational Awareness		Gathering Awareness		
		Understanding Awareness		
		Anticipating Future Events		
Decision Making		Analytical Decision Making		
		Following Orders & Procedures		
		Intuitive Decision Making		

* 1 – Unsatisfactory; 2 – Marginal; 3 – Satisfactory; 4 – Outstanding; N/O – Not Observed

1 – Unsatisfactory: Watchstander could endanger ship and crew without considerable improvement.

2 – Marginal: Watchstander requires improvement.

3 – Satisfactory: Watchstander performed at an acceptable level, but room for improvement exists.

4 – Outstanding: Watchstander performed at a consistently high level.

N/O – Not Observed: Element or skill was not observed during this evolution.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

- Chief of Naval Operations. (2005). *Standard organization and regulations of the U.S. Navy* (OPNAVINST 3120.32C CH-6). Washington, D.C.: Department of the Navy.
- Endsley, M. (1995). Toward a theory of situational awareness in dynamic systems. *Human Factors*, 37(1), 32-64.
- Flin, R., O'Connor, P., & Crichton M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Aldershot, England: Ashgate Publishing Limited.
- Klampfer, B., Flin, R., Helmreich, R., Häusler, R., Sexton, B., Fletcher G., et al. (2001). Enhancing performance in high risk environments: Recommendations for the use of behavioural markers. Behavioural Markers Workshop. Zurich. Available from: homepage.psy.utexas.edu/homepage/group/helmreichlab/publications/pubfiles/pub262.pdf.
- Klein, G. (1998). *Sources of power: How people make decisions*. Cambridge, MA: The MIT Press.
- Long, W. M. (2010). Development of the non-technical skills for officers of the deck (NTSOD) rating form. (Draft Thesis) Monterey, CA: Naval Postgraduate School.
- Stavridis, J., & Girrier, R. (2007). *Watch officer's guide* (15th ed.). Annapolis, MD: United States Naval Institute.
- Yule, S., Flin, R., Paterson-Brown, S., Maran, N., & Rowley, D. (2006). Development of a rating system for surgeons' non-technical skills. *Medical Education*, (40), 1098-1104.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Research Office (Code 09).....1
Naval Postgraduate School
Monterey, CA 93943-5000
2. Dudley Knox Library (Code 013).....2
Naval Postgraduate School
Monterey, CA 93943-5002
3. Defense Technical Information Center2
8725 John J. Kingman Rd., STE 0944
Ft. Belvoir, VA 22060-6218
4. Richard Mastowski (Technical Editor).....2
Graduate School of Operational and Information Sciences (GSOIS)
Naval Postgraduate School
Monterey, CA 93943-5219
5. W. Max Long1
Operations Research Department
Naval Postgraduate School
Monterey, CA 93943-5219
6. Paul E. O'Connor1
Centre for Intervention and Structural Change
National University of Ireland
Galway, Ireland
7. Michael E. McCauley1
Operations Research Department
Naval Postgraduate School
Monterey, CA 5219
8. Kyle H. Turner1
SWOSCOLCOM
446 Cushing Rd.
Newport, RI 02841